



Country profile – Germany

The section 'Key climate- and energy-related data' was prepared by the EEA. It includes the latest data available as of 31 July 2014

The section 'Climate and energy policy framework' was prepared by eclareon and Ecologic Institute, Germany. It includes the latest information on national policies and measures available as of 31 May 2014.

For methodological details and other country profiles, see www.eea.europa.eu/themes/climate/country-profiles.

Key climate- and energy-related data — Germany

Key data on GHG emissions	2005	2011	2012	2013	EU 2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO ₂ -eq.)	994.5	928.7	939.1	950.8	4 544.2
GHG per capita (t CO ₂ -eq./cap.)	12.1	11.4	11.5	11.6	9.0
GHG per GDP (g CO ₂ -eq./PPS in EUR)	464	368	364	364	350
Share of GHG emissions in total EU-28 emissions (%)	19.2 %	20.2 %	20.7 %	21.3 %	100 %
EU ETS verified emissions (Mt CO ₂ -eq.)	475.1	450.4	452.6	480.9	1 848.6
Share of EU ETS emissions in total emissions (%)	48 %	48 %	48 %	51 %	41 %
ETS emissions vs allowances (free, auctioned, sold) (%)	- 3.7 %	+ 2.2 %	- 4.0 %	+ 28.4 %	- 14.1 %
Share of CERs & ERUs in surrendered allowances (%)	0.0 %	16.5 %	31.1 %	n.a.	26.4 %
Non-ETS (ESD) emissions, adjusted to 2013–2020 scope (Mt CO ₂ -eq.)	483.0	453.3	461.4	468.0	2 566.6
Key data on renewable energy	2005	2010	2011	2012	EU 2012
Share of renewable energy in gross FEC (%)			11.6 %	12.4 %	14.1 %
() = including all biofuels consumed in transport	(6.7 %)	(10.7 %)			
Share of renewable energy for electricity (%)	10.5 %	18.1 %	20.9 %	23.6 %	23.5 %
Share of renewable energy for heating and cooling (%)	6.8 %	10.3 %	10.8 %	11.1 %	15.6 %
Share of renewable energy for transport (%)			5.9 %	6.9 %	5.1 %
() = including all biofuels consumed (%)	(3.7 %)	(6.0 %)			
Key data on energy consumption	2005	2010	2011	2012	EU 2012
Primary energy consumption (Mtoe)	317.2	311.1	294.7	297.6	1 584.8
Primary energy consumption per capita (Mtoe/cap.)	3.8	3.8	3.6	3.6	3.1
Final energy consumption (Mtoe)	218.5	220.5	209.2	213.1	1 104.5
Final energy consumption per capita (Mtoe/cap.)	2.6	2.7	2.6	2.6	2.2
Efficiency of conventional thermal electricity and heat production (%)	49.6 %	50.4 %	49.9 %	48.9 %	50.0 %
Energy consumption per dwelling by end use	2005	2009	2010	2011	EU 2011
Total energy consumption per dwelling (toe/dwelling)	1.67	1.60	1.62	1.62	1.42
Space heating and cooling (toe/dwelling)	1.24	1.15	1.12	1.13	0.96
Water heating (toe/dwelling)	0.19	0.21	0.23	0.24	0.18
Cooking (toe/dwelling)	0.06	0.05	0.05	0.05	0.08
Electricity (lighting, appliances) (toe/dwelling)	0.18	0.19	0.21	0.20	0.20

Progress towards GHG targets (under the Effort Sharing Decision, i.e. non-ETS emissions)

2013 ESD target (% vs base year)	- 4.5 %	2020 ESD target (% vs base year)	- 14.0 %
2013 ESD emissions (% vs base year)	- 3.8 %	2020 ESD projections WEM (% vs base year)	- 13.3 %
		2020 ESD projections WAM (% vs base year)	- 17.6 %

Based on approximated emission estimates for 2013, emissions covered by the Effort Sharing Decision (ESD) (i.e. in the sectors which are not covered by the EU ETS) are expected to be above the annual ESD target in 2013. Projections indicate that 2020 ESD emissions are expected to be below the 2020 ESD target, only if measures planned until 2013 are fully implemented.

Progress towards renewable energy targets

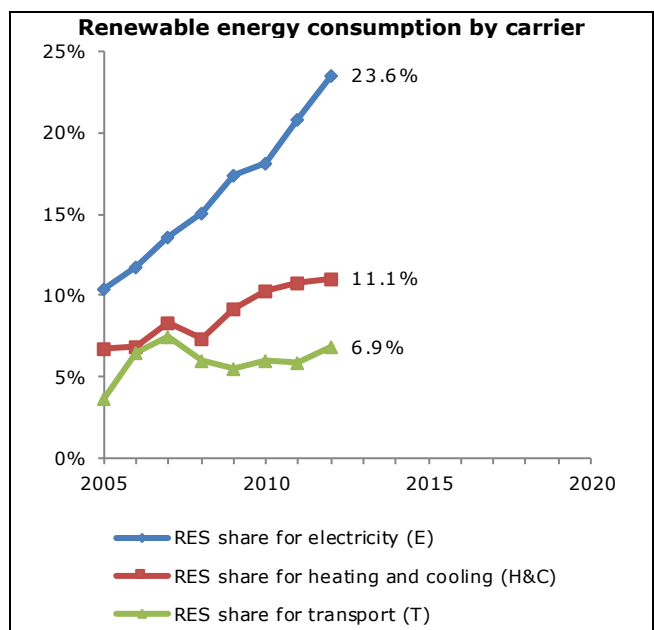
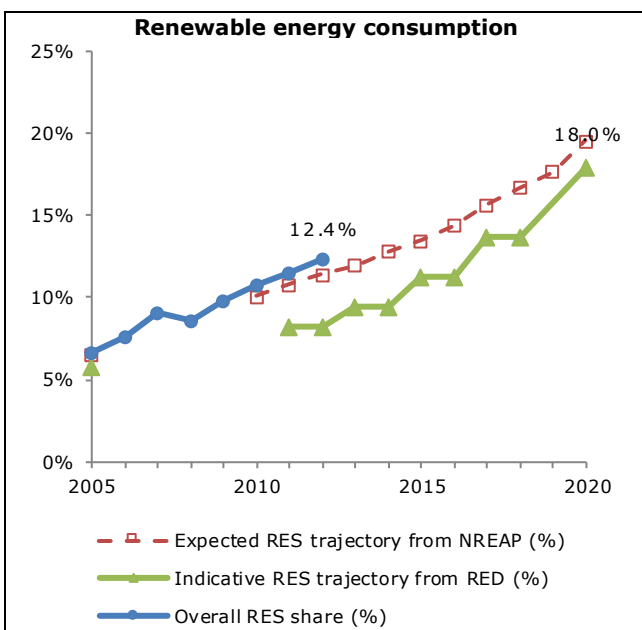
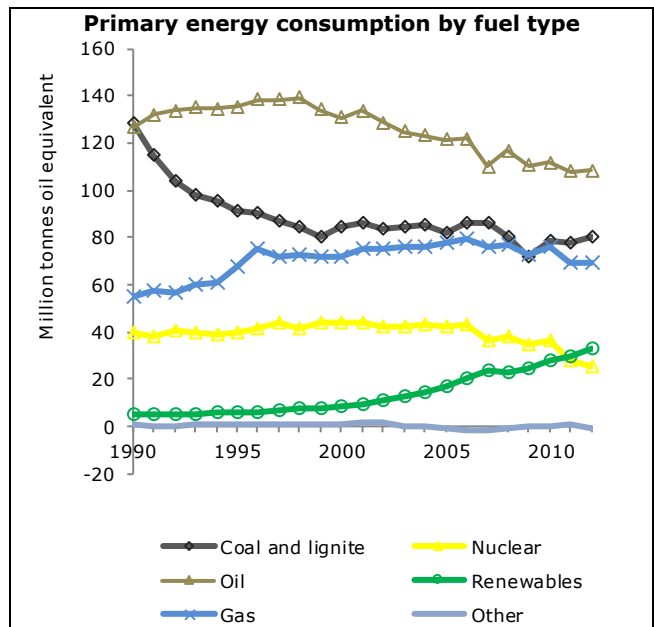
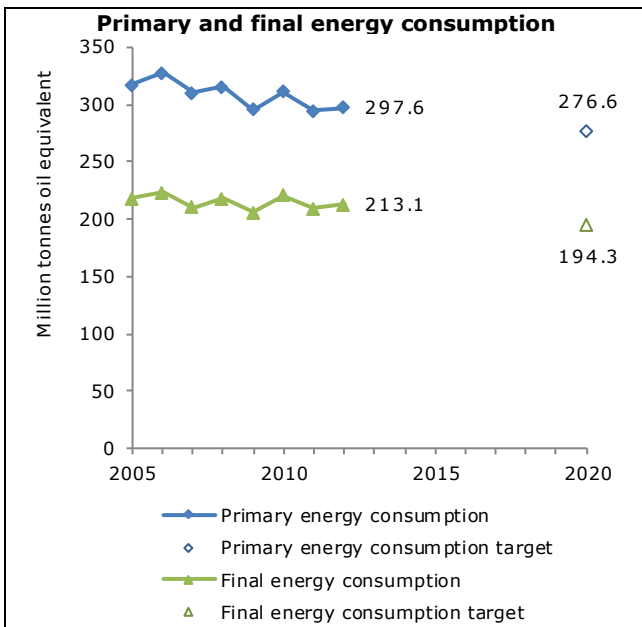
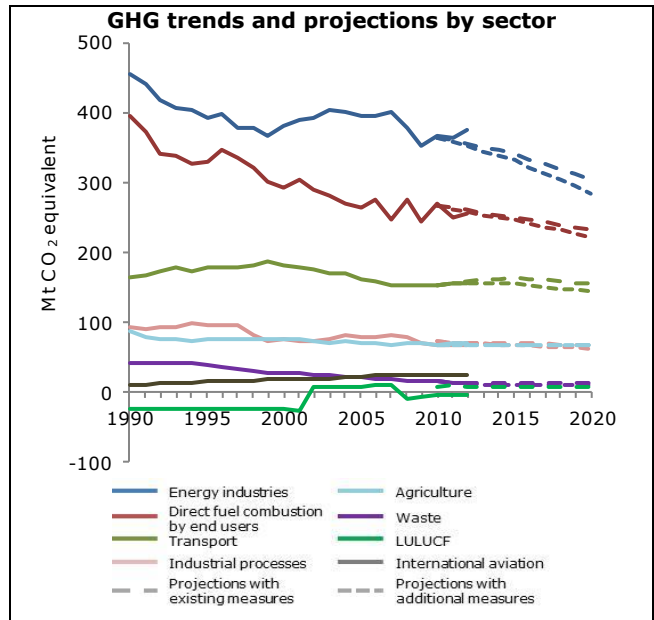
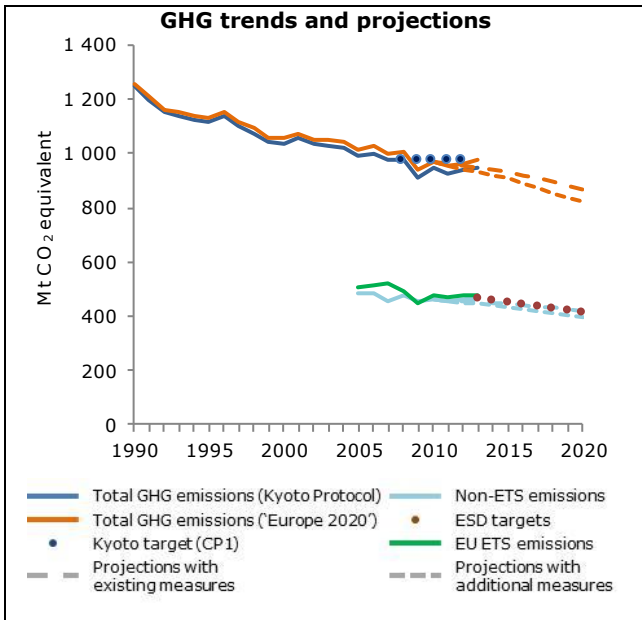
2012 RES share in gross final energy consumption (%)	12.4 %	2011–2012 indicative share from RES Directive (%)	8.2 %
2020 RES target	18.0 %	2012 expected share from NREAP (%)	11.4 %

The average share of renewable sources in gross final energy consumption for 2011–2012 was 12.0% (26.2 Mtoe), which is higher than the indicative RED target for 2011–2012 (8.2%). At the same time, the share of renewables in 2012 (12.4 %) is higher than the expected 2012 NREAP target (11.4 %). Over the period 2005–2012 the observed average annual growth rate in renewable energy consumption amounted to 11.0%. In order to reach its 2020 NREAP target, Germany needs an average annual growth rate of 4.4% in the run-up to 2020. In absolute terms, this is equivalent to 0.8 time its cumulative effort so far.

Progress towards energy efficiency targets

Primary energy consumption:		Final energy consumption:	
2005–2012 average annual change	-0.9 %	2005–2012 average annual change	-0.4 %
2012–2020 average annual change to target	-0.9 %	2012–2020 average annual change to target	-1.1 %

The reductions in primary and final energy consumption have not been taking place at sufficient pace to put Germany on track towards its 2020 targets. Transformation input to conventional thermal power stations represents 31.5 % of total primary energy consumption, and the increased use of coal has resulted in a deterioration of efficiency in transformation. Improving energy efficiency in transformation could therefore contribute to further reducing primary energy consumption. Further efforts to improve energy efficiency in the industrial sector, where energy consumption increased by 3.3 % over the period 2005–2012, could contribute to further reducing final energy consumption.



Climate and energy policy framework

Challenges and opportunities

Germany has set itself national climate and energy targets beyond its requirements under EU legislation, but the country is currently experiencing slightly rising greenhouse gas (GHG) emissions. Additional efforts are required in energy efficiency of buildings and the transport sector in particular. The government wants the building stock to become almost carbon neutral by 2050, for example. However, consumption per dwelling is quite high and the measures implemented so far to address energy efficiency in buildings are at present insufficient to reach this target, as per the responsible Ministry's own analysis (BMVBS, 2013). However, energy efficiency has already become an important economic sector, through investments in building materials and construction, energy consultancy and building management. In 2012, these amounted to a turnover of EUR 146 billion in 2012, which is a 16 % increase compared to 2011. More than 800 000 jobs are already connected to the sector (DENEFF, 2013). If the funding set aside to support efficient buildings were to be increased from around EUR 0.8–2.0 billion per year in the last few years to EUR 5 billion, an additional positive effect on investment is expected, forecast to lead to a possible gross value added of EUR 10 billion per year and 250 000 additional jobs (Prognos, 2013).

In the transport sector, Germany aims at reducing energy consumption by 10 % from 2005 levels by the year 2020. However, between 2005 and 2012 consumption remained almost stable. At the same time, carbon dioxide (CO₂) emissions from newly registered passenger cars are the highest compared to other EU-15 countries (and the 8th highest in the EU-28) due to a high share of cars with high engine power and mass. Incentivising the purchasing of efficient and low-carbon vehicles and further promoting the shift to public transport and non-motorised individual transport would reduce energy consumption and related GHG emissions and it also would help to reduce air pollution and noise in cities.

Climate and energy strategies

Germany has committed to ambitious emission reductions that go beyond the target set by the EU: the Integrated Energy and Climate Package of 2007 and 2008 stipulates a 40 % emission reduction target by 2020, compared to 1990 levels. The Energy Concept 2010 provides a long-term strategy for German energy policy and sets a path for a reduction of GHG emissions by 80–95 % until 2050 (BMU & BMWi, 2010). Its principal objective is to ensure the provision of environmentally friendly, reliable and affordable energy supply while turning Germany into one of the greenest economies in the world. The Energy Concept sets targets for the share of renewable energies in electricity, heat and transport, as well as for electricity generated from cogeneration, reduction of electricity consumption, overall energy efficiency improvements, and for energy consumption reductions in buildings and transport. In addition, Germany will phase out nuclear energy by 2022.

By 2016, the German government plans to publish a National Climate Protection Plan 2050 to analyse existing measures and requirements for additional measures to reach the domestic long-term targets.

Renewable energy

Renewable energies play an important role in Germany as about one third of the GHG emission reductions by 2020 should be realised through the shift to renewables (Löschel et al., 2014 based on Energy Concept). The objective is to increase the share of renewable electricity to at least 35 % in 2020 (Energy Concept), by 2025 in a corridor of 40–45 % and by 2035 in a corridor of 50–65 % (CDU/CSU/SPD, 2013; EEG, 2014). The main support mechanism for renewable electricity generation has so far been a feed-in tariff (FIT) introduced in the Renewable Energy Law from 2000. The law was revised several times to introduce the option to shift to a market premium scheme, adjust feed-in rates to cost reductions, and change the coverage of technologies as well as the coverage of different biomass resources to new findings in particular with respect to a sustainable biomass use. The revised law came into force on 1 August 2014. Among others, the following changes have been made: 1) the premium system and direct marketing have become mandatory for new installations with support covering the difference between a rolling average wholesale price and the statutory support level; 2) the remuneration structure for new biogas plants was modified to incentivise power generation according to demand and to favour the use of residue and/or organic waste; 3) support levels were reduced and will further automatically be reduced depending on over- or under-achievement of the predefined deployment corridor. This had already been in place for photovoltaics (PVs) and is now also introduced for wind and bioenergy; 4) the support will in the future be focused on the most cost-efficient technologies; and 5) in the next 2 years tendering will be tested for ground-mounted PVs and by 2017 be used for the expansion of renewable electricity production from different sources (EEG, 2014). In addition to the EEG support scheme, the KfW bank offers low interest loans for specific investments in renewable electricity generation capacities (KfW, 2014).

The domestic target for renewable heating and cooling is a share of 14 % in 2020. The principal instrument to promote renewables in heating and cooling is the Renewable Energies Heat Act. It obliges owners of new as well as of buildings in possession of public authority undergoing major renovations to cover a specific share of the heating and cooling with renewable energies. The share depends on the chosen technology. Financial support for renewable heating and cooling systems in existing buildings is provided by a market incentive programme that offers low-interest loans and grants for investments.

Energy networks

The government has taken several measures to speed up the expansion of the electricity network: the 2009 Power Grid Expansion Act (EnLAG) defined 24 priority grid expansion projects for which the proof of need is not required, thus reducing the time needed for the approval process. Following further delays in the network expansion, the government approved the Grid Expansion Acceleration Act (NABEG) and the amendment of the Energy Industry Act (EnWG) in 2011, which defines a simplified approval process for the most important cross-border and grid connections crossing German states. The current Energy Industry Act requires that the German transmission system operators collaborate to develop a new grid development plan (Netzentwicklungsplan) every year. This plan 'must contain all effective measures for the necessary optimisation, development and expansion of the network, which are required over the next ten years to ensure safe and reliable network operation' (Section 12b I 2 EnWG). Every three years the Bundesnetzagentur gives the German government an approved grid development plan and an environmental report to be used as a draft for the Federal Requirement Plan (Bundesbedarfsplan).

Energy efficiency

The German government wants to publish a national action plan for improving energy efficiency by the end of 2014, which will embrace the targets for the different areas, the instruments, the funding and respective responsibilities of the different stakeholders.

Energy **taxation** is above EU average but the electricity and energy tax is partly reduced or reimbursed for energy-intensive **industry**. From 2013 onwards, these tax reliefs are only granted for companies introducing energy or environmental management systems or alternative systems for small and medium-sized enterprises (SMEs) and provided that the producing industry as a whole complies with the annual energy efficiency goals regulated by law. In addition, there are reduced grid network charges for energy-intensive industry according to the Network Charges Ordinance and German industry can benefit from state aid in accordance with Art. 10a of the EU Emissions Trading System (ETS) Directive (2009/29/EC) allowing energy-intensive industries to offset the costs from EU emissions trading by receiving compensation payments from the state (BMW, 2013).

SMEs get financial support for efficiency improvements, for example through the national Energy and Climate Fund that supports companies to realise efficiency potentials in the short term through different calls such as 'Investment grants for highly efficient cross-sectional technologies in SMEs' (BMW, 2014). In addition, energy consulting for SMEs is financed with grants of up to 80 % of the eligible consultancy costs through the programme 'Energy Consulting in SMEs'. For the realisation of the identified efficiency potentials the KfW bank offers low-interest loans.

Combined heat and power (CHP) can receive an investment grant if the capacity is below 20 kW, and according to the CHP Act a premium is paid for the generated electricity fed into the grid (BAFA, 2014).

In the **building** sector, the Energy Saving Ordinance (EnEV) sets minimum requirements for the energy performance of buildings and introduces Energy Performance Certificates. The last amendment entered into force on 1 May 2014, increasing the energy efficiency requirements by 25 % for new buildings starting from 1 January 2016. Furthermore, house owners have to replace oil and gas heaters installed before 1 January 1985 or older than 30 years until 2015. By 2021, all new buildings need to fulfil the nearly energy-neutral standard. For public buildings, this obligation applies already from 2019 onwards (BMVBS, 2013). Grants and low-interest loans are available for efficient new buildings and for energy efficiency refurbishments of existing buildings through the CO₂ rehabilitation programme. In recent years, it had a budget of around EUR 1.5–2.0 billion per year (since 2012) funded by the Climate and Energy Fund. The programme is coordinated by the German public development bank KfW (BMVBS, 2012).

Transport

The Mobility and Fuel Strategy, a so-called 'learning strategy', aims at giving information and orientation but focuses on fuels and does not address overall questions of future mobility. German incentives for the purchasing of efficient cars, more efficient driving and shifting to public transport include an annual ownership tax that is based on CO₂ emissions and cylinder capacity. However, it is only at EU average and there is no registration tax (ACEA, 2012). Cars emitting less than 110 g/km are exempted from the CO₂-related part of the ownership tax for 10 years. The exemptions include all types of electric vehicles. Lorries pay a distance-based toll for using motorways and federal highways (CE Delft, 2012). Taxes on transport fuels are well above the EU average for petrol and for diesel. However, diesel is taxed at strikingly lower rates than petrol (European Commission, 2013). An air tax was introduced in 2011 that depends on the flight distance (EEA, 2013).

The main support mechanism for renewables in transport is a quota obligation that requires companies to ensure that biofuels make up a defined percentage of the company's total annual sale of fuel as set out in the Biofuel Quota Act. From 2015, a GHG reduction quota will replace the biofuels quota (RES Legal, 2013). In addition, there is a tax relief for pure biofuels that are not used to fulfil the biofuels quota. The Programme for Electric Mobility published in 2011 highlights policies and measures to increase the number of electric cars to 1 million by 2020 and to turn Germany into a leader in electromobility. The National Innovation Programme for Hydrogen and Fuel Cell Technology provides support amounting to EUR 1.4 billion until 2016.

Germany wants to improve public transport by developing a nation-wide schedule and integrated ticketing system. The capacities of the railway network will be increased to avoid bottlenecks and better link intermodal connections. The National Bicycle Traffic Plan 2020 aims at expanding the infrastructure for bicycles, including more parking places, increased connections to main roads, and other means of transport and security measures. In addition, the improvement of pedestrian traffic is foreseen by reduced waiting times at traffic lights and extended pedestrian areas (EEA, 2013).

Agriculture

Measures are mainly determined by the Common Agricultural Policy (CAP) of the EU. This includes that aid to farmers is linked to environmental requirements (cross-compliance), and national and regional agri-environmental measures co-financed by the EU (European Agricultural Fund for Rural Development (EAFRD)). Meanwhile, direct payments have been fully decoupled in Germany and are paid per hectare, with no linkage to livestock numbers any more. In this context, Germany also set up requirements for nitrogen fertiliser use (2009 Fertiliser Act and related Ordinance on Fertilisation), and it promotes organic farming, extensification and environmentally sound livestock raising (NC6 2013, 2013).

Waste

The main measures in the waste sector limiting GHG emissions include the Closed Cycle and Waste Management Act stipulating the recycling of wastes and the Landfill Ordinance prohibiting the landfilling of biodegradable waste that would otherwise lead to methane emissions on landfills. The Ordinance on Incineration and Co-incineration of Waste largely prohibits landfilling of untreated waste and incentivises incineration or mechanical-biological waste treatment over landfilling (NC6 2013, 2013; EEA, 2013).

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